DEFENSE INFORMATION SYSTEMS AGENCY
JOINT INTEROPERABILITY TEST COMMAND
2001 BRAINARD ROAD
FORT HUACHUCA, ARIZONA 85613-7051

IN REPLY REFER TO: Networks, Transmission and Integration Division (JTE)

MEMORANDUM FOR DISTRIBUTION November 26, 2003

SUBJECT: Joint Interoperability Test Certification of Nortel Networks BroadBand Signal Transfer Point (BBSTP) with Software Release USP 7.0.5

References:

(a) DOD Directive 4630.5, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 11 January 2002

(b) CJCSI 6212.01B, "Interoperability and Supportability of National Security Systems, and Information Technology Systems," 8 May 2000

1. References (a) and (b) establish the Defense Information Systems Agency, Joint Interoperability Test Command (JITC), as the responsible organization for interoperability test certification. Additional references are provided in enclosure 1.

2. The Nortel Networks BroadBand Signal Transfer Point (BBSTP) with Software Release USP 7.0.5 meets the interoperability requirements for deployment in the Defense Switched Network and is certified for joint use. This certification expires upon changes that affect interoperability, but no later than three years from the date of this memorandum.

3. This certification is based on testing conducted by the JITC Network Engineering and Integration Lab, Fort Huachuca, Arizona from January 25 through August 20, 2003. The Certification Testing Summary (enclosure 2) provides more details about the test, documents the test results, and describes the test network. Users should verify interoperability before deploying the Nortel Networks BBSTP in an operational environment that varies significantly from the test environment.

4. Interoperability certification testing of the Nortel Networks BBSTP consisted of two areas: the BBSTP's conformance to Signaling System 7 (SS7) standards and the BBSTP's ability to support required interfaces with associated Exchange Requirements (ERs) specified in reference (c). Testing was conducted using test procedures in reference (d). The overall system interoperability performance was derived from test procedures listed in reference (e). Table 1 lists the SS7 conformance requirements status and table 2 lists the interface and ER interoperability status.

Table 1. Nortel Networks BBSTP Conformance Requirements Status

Conformance Requirement	Reference	Critical	Status
SS7 Network Structure	GSCR Para 6.5.1	Yes	Met
Signaling Link Characteristics	GSCR Para 6.5.2	Yes	Met
Signaling Message Handling, Formats, and Codes	GSCR Paras 6.5.3-5, 6.5.10-11	Yes	Met
Signaling Network Management	GSCR Para 6.5.4	Yes	Met
Error Detection and Recovery	GSCR Para 6.5.2.1	Yes	Met
Signaling Link Congestion	GSCR Para 6.5.4.2	No	Not tested

LEGEND:
BBSTP - BroadBand Signal Transfer Point
GSCR - Generic Switching Center Requirements
SS7 - Signaling System 7

Table 2. Nortel Networks BBSTP Interface & Exchange Requirements Interoperability Status

Interface	Exchange Requirement	Critical	Status	Remarks
V.35	SS7 A, B & C-Links IAW GSCR Para 6.5	No	Certified	All critical ERs met
OCU-DP	SS7 A, B & C-Links IAW GSCR Para 6.5	No[1]	Not Tested	
DS0A	SS7 A, B & C-Links IAW GSCR Para 6.5	No[1]	Not Tested	
DS1	SS7 A, B & C-Links IAW GSCR Para 6.5	No[1]	Not Tested	

LEGEND:
A-Link - Access Link (SS7)
B-Link - Bridge Link (SS7)
BBSTP - BroadBand STP
C-Link - Cross Link (SS7)
DS0 - Digital Signal Level Zero: One 64 kbps channel
DS0A - A process where a sub-rate signal is repeated 20, 10, or 5 times to make a 64 kbps DS0 channel
DS1 - Digital Signal Level One: 1.544 Mbps North American Transmission
DSN - Defense Switched Network
ER - Exchange Requirement
GSCR - Generic Switching Center Requirements
IAW - In Accordance With
ITU - International Telecommunication Union
kbps - kilobits per second
Mbps - Megabits per second
OCU-DP - Office Channel Unit-Data Port
SS7 - Signaling System 7
STP - Signal Transfer Point
V.35 - ITU Standard for synchronous data circuits

Note:
1 Per the GSCR, only one of the four STP interfaces is required for certification (V.35, DS0A, DS1, or OCU-DP). These interfaces are not implemented in the DSN, and therefore were not tested.

5. The Nortel Networks BBSTP with Software Release USP 7.0.5 meets all critical conformance requirements. Conformance to signaling link congestion requirements was not tested because the traffic loading resources currently available at the JITC were unable to initiate enough call attempts to overload a signaling link or exceed congestion onset thresholds. This limitation will have no operational impact in Defense Information Systems Network (DISN)-Europe or DISN-Pacific because the Nortel Networks BBSTP is successfully deployed in large commercial SS7 networks with volumes of signaling traffic in excess of what the Department of Defense is expected to generate.

6. Section 6 of reference (d) requires that STPs provide at least one of the following interface types: V.35, Office Channel Unit-Data Port (OCU-DP), Digital Signal Level One (DS1) or Digital Signal Level Zero A (DS0A). The Nortel Networks BBSTP is capable of supporting

V.35, DS1, and DS0A interfaces. The V.35 interface is planned for use in DISN-Europe. The DS1 and DS0A interfaces were not tested and are therefore not covered by this certification.

7. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system -- ERD uses unclassified (NIPRNET) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNET at https://stp.fhu.disa.mil/. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at http://jit.fhu.disa.mil (NIPRNET), or http://199.208.204.125/ (SIPRNET). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at http://jitc.fhu.disa.mil/tssi.

8. The JITC point of contact is LCDR Michael Wojcik, DSN 879-6787 or commercial (520) 538-6787. The e-mail address is wojcikm@fhu.disa.mil.

FOR THE COMMANDER:

2 Enclosures:
1 Additional References
2 Certification Testing Summary

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Chief
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JITC Memo, Networks, Transmission and Integration Division (JTE), Joint Interoperability Test Certification of Nortel Networks BroadBand Signal Transfer Point (BBSTP) with Software Release USP 7.0.5

US Joint Forces Command, J6I, C4 Plans and Policy, 1562 Mitscher Ave, Norfolk, VA 23551-2488

Commander, Defense Information Systems Agency (DISA), ATTN: NS53 (Mr. Osman), Room 5w23, 5275 Leesburg Pike (RTE 7) Falls Church, VA 22041

Additional References

(c) Defense Information Systems Agency (DISA), Joint Interoperability and Engineering Organization (JIEO), Technical Report 8249, "Defense Information Systems Network (DISN) Circuit Switched Subsystem, Defense Switched Network (DSN) Generic Switching Center Requirements (GSCR)," March 1997

(d) Joint Interoperability Test Command, "Signaling System 7 Signal Transfer Point Test Plan," July 2001

(e) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP)," 17 June 1999

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. Nortel Networks BroadBand Signal Transfer Point (BBSTP) with Software Release USP 7.0.5.

2. PROPONENT. Defense Information Systems Agency.

3. PROGRAM MANAGER. Mr. Howard Osman, ATTN NS53, Room 5w23, 5275 Leesburg Pike (RTE 7), Falls Church, VA 22041, e-mail: Osmanh@ncr.disa.mil.

4. TESTERS. Joint Interoperability Test Command (JITC), Fort Huachuca, AZ.

5. SYSTEM UNDER TEST DESCRIPTION. Signal Transfer Points (STPs) are deployed in the Defense Switched Network (DSN) to route signaling messages between Service Switching Points (SSPs). The Nortel Networks BBSTP is a standalone STP capable of routing call setup, call control, network management, user-to-network, and user-to-user signaling messages throughout Signaling System 7 (SS7) networks. The STPs also support a broad range of intelligent network services such as Local Number Portability and Calling Name Delivery.

6. OPERATIONAL ARCHITECTURE. The Nortel Networks BBSTP was tested at the JITC Network Engineering and Integration Lab over a configuration similar to the DSN architecture defined in the Generic Switching Center Requirements (GSCR) document. Nortel Networks BBSTPs are currently deployed in Europe.

7. REQUIRED SYSTEM INTERFACES. Testing was carried out in accordance with GSCR, dated March 1997. Table 2-1 lists the SS7 conformance requirements status, and table 2-2 lists the interoperability status for each interface along with associated Exchange Requirements. The GSCR requires that STPs support at least one of the following data link interfaces: V.35, Office Channel Unit-Data Port (OCU-DP), Digital Signal Level One (DS1), or Digital Signal Level Zero A (DS0A). The Nortel Networks BBSTP supports the V.35, DS0A, and DS1 interfaces; however, only the V.35 interface was tested.

Table 2-1. Nortel Networks BBSTP SS7 Conformance Requirements Status

Conformance Requirement	Reference	Critical	Status
SS7 Network Structure	GSCR Para 6.5.1	Yes	Passed
Signaling Link Characteristics	GSCR Para 6.5.2	Yes	Passed
Signaling Message Handling, Formats, and Codes	GSCR Paras 6.5.3-5, 6.5.10-11	Yes	Passed
Signaling Network Management	GSCR Para 6.5.4	Yes	Passed
Error Detection and Recovery	GSCR Para 6.5.2.1	Yes	Passed
Signaling Link Congestion	GSCR Para 6.5.4.2	No	Not Tested

LEGEND:

BBSTP - BroadBand Signal Transfer Point
GSCR - Generic Switching Center Requirements
SS7 - Signaling System 7

Table 2-2. Nortel Networks BBSTP Interface & Exchange Requirement Interoperability Status

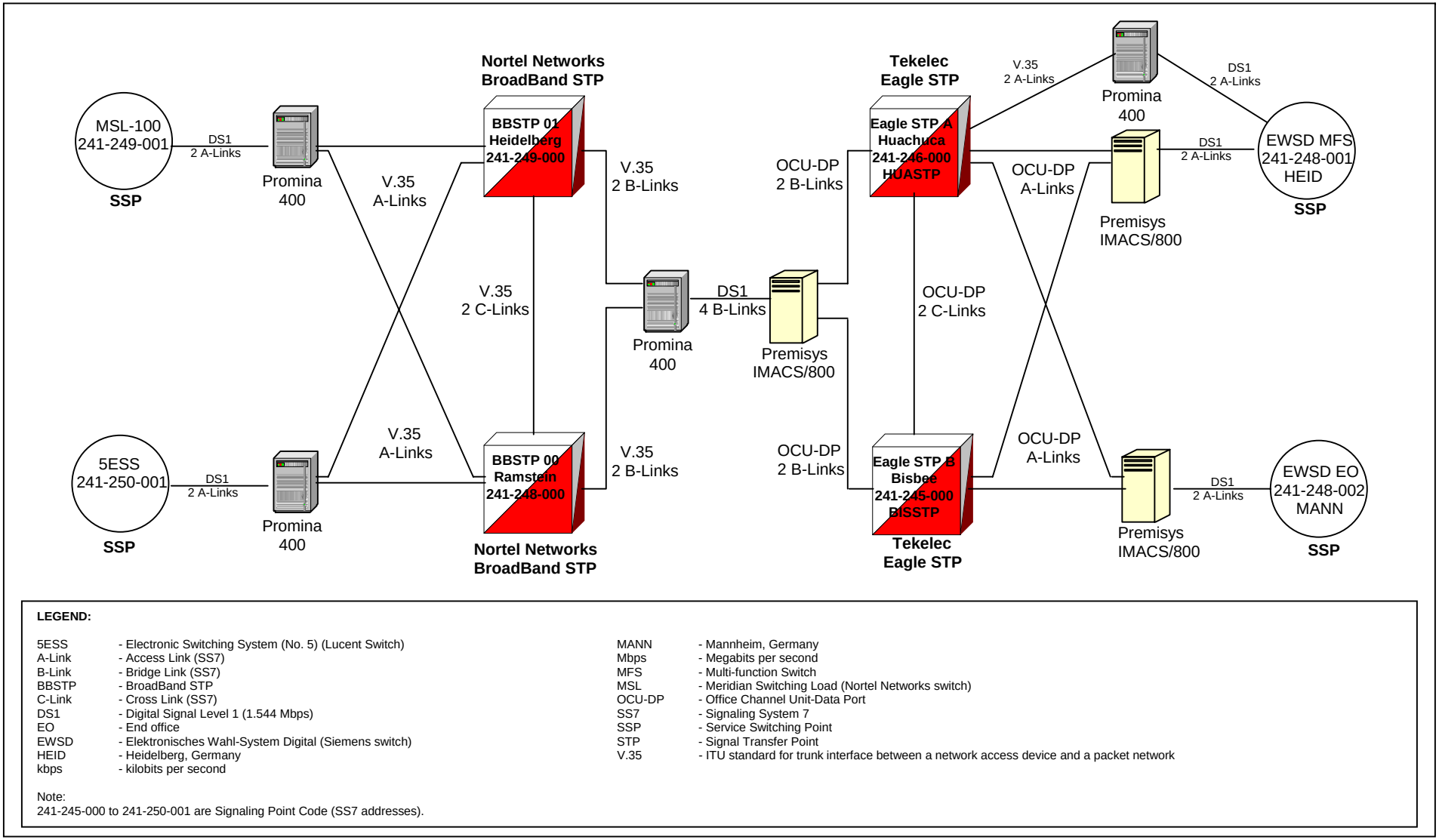
Interface	Exchange Requirement	Critical	Status
V.35	SS7 A, B & C-Links IAW GSCR Para 6.5	No	Certified
OCU-DP	SS7 A, B & C-Links IAW GSCR Para 6.5	No[1]	Not Tested
DS0A	SS7 A, B & C-Links IAW GSCR Para 6.5	No[1]	Not Tested
DS1	SS7 A, B & C-Links IAW GSCR Para 6.5	No[1]	Not Tested

LEGEND:

A-Link - Access Link (SS7)
B-Link - Bridge Link (SS7)
BBSTP - BroadBand STP
C-Link - Cross Link (SS7)
DS0 - Digital Signal Level Zero: One 64 kbps channel
DS0A - A process where a sub-rate signal is repeated 20, 10, or 5 times to make a 64 kbps DS0 channel
DS1 - Digital Signal Level One: 1.544 Mbps North American Transmission
DSN - Defense Switched Network
GSCR - Generic Switching Center Requirements
IAW - In Accordance With
ITU - International Telecommunication Union
kbps - kilobits per second
Mbps - Megabits per second
OCU-DP - Office Channel Unit-Data Port
SS7 - Signaling System 7
STP - Signal Transfer Point
V.35 - ITU standard for trunk interface between a network access device and a packet network

Note:
1 Per the GSCR, only one of the four STP interfaces is required for certification (V.35, DS0A, DS1, or OCU-DP). These interfaces are not implemented in the DSN, and therefore were not tested.

8. TEST NETWORK DESCRIPTION. The test network configuration depicted in figure 2-1 accurately emulates the DSN SS7 operational environment. The Nortel Networks BBSTPs were configured as mated pairs and connected to the Nortel Meridian Switching Load (MSL)-100, and Lucent Electronic Switching System Number 5 (5ESS) SSPs via N.E.T. Promina 400 channel banks. The N.E.T. Promina 400 channel banks were used to convert the V.35 links provided by Nortel Networks BBSTP to DS1.



LEGEND:

5ESS	- Electronic Switching System (No. 5) (Lucent Switch)
A-Link	- Access Link (SS7)
B-Link	- Bridge Link (SS7)
BBSTP	- BroadBand STP
C-Link	- Cross Link (SS7)
DS1	- Digital Signal Level 1 (1.544 Mbps)
EO	- End office
EWSD	- Elektronisches Wahl-System Digital (Siemens switch)
HEID	- Heidelberg, Germany
kbps	- kilobits per second
MANN	- Mannheim, Germany
Mbps	- Megabits per second
MFS	- Multi-function Switch
MSL	- Meridian Switching Load (Nortel Networks switch)
OCU-DP	- Office Channel Unit-Data Port
SS7	- Signaling System 7
SSP	- Service Switching Point
STP	- Signal Transfer Point
V.35	- ITU standard for trunk interface between a network access device and a packet network

Note:
241-245-000 to 241-250-001 are Signaling Point Code (SS7 addresses).

Figure 2- 1. Test Network

9. SYSTEM CONFIGURATIONS. Table 2-3 lists the hardware and software configurations associated with the components used during the test.

Table 2-3. Tested System Configuration

System Name	Hardware	Software
Tekelec Eagle STP	Eagle Data Packet Switch	Release 28.0.1-41.53.0
Nortel Networks BroadBand STP	Signaling Server Platform	Version USP 7.0.5
Nortel Networks MSL-100 SSP	RISC Processor	MSL-17
Siemens EWSD SSP	CP 113C	Version 19D, Patch Set 39
Lucent 5ESS SSP	5ESS	5E16
Promina 400	Promina 400	2.04.03
Premisys IMACS/800 Channel Bank	Premisys IMACS/800	Release 3.8.0

LEGEND:

5ESS - Electronic Switching System (No. 5)
CP - Central Processor
CSU - Channel Service Unit
DSU - Data Service Unit
EWSD - Elektronisches Wahl-System Digital
IMACS - Integrated Multiple Access Communications Server
MSL - Meridian Switching Load
RISC - Reduced Instruction Set Computer
SSP - Service Switching Point
STP - Signal Transfer Point
USP - Universal Signaling Point

10. TESTING LIMITATIONS. All interfaces required for initial deployment of the Nortel Networks BBSTPs were successfully tested in an operationally realistic environment; however, JITC did not have available test equipment capable of generating enough voice and signaling traffic to demonstrate compliance with the signaling link congestion control requirements specified in reference (c). This limitation will have no operational impact in DISN-Europe because the Nortel Networks BBSTPs are currently deployed successfully in large commercial SS7 networks with volumes of signaling traffic in excess of what the Department of Defense is expected to generate.

11. TEST RESULTS

a. Conformance Results. The Nortel Networks BBSTP with Software Release USP 7.0.5 meets all the SS7 STP conformance requirements in accordance with references (c) and (d) using the detailed test procedures described in reference (e), with one exception (refer to table 2-1). Sub-test 6.0 (Signaling Link Congestion) was not tested. The traffic loading resources currently available at the JITC were unable to initiate enough call attempts to overload a signaling link or exceed congestion onset thresholds. The inability to verify STP and SSP compliance with congestion control requirements has a minimal operational impact. One 56 kilobits per second signaling link has more than enough capacity to support the traffic normally routed between two DSN SSPs.

b. Interoperability Results

(1) Interoperability between the Nortel Networks BBSTP, the Nortel Networks MSL-100, and Lucent 5ESS SSPs was successfully tested via the following SS7 signaling link interfaces: A-Links, B-Links, and C-Links. These links were delivered to the Nortel Networks BBSTP via V.35 interfaces as shown in figure 2-1. SS7 call setup and control messages were routed to the correct destinations by the STPs and inter-switch calls were completed successfully. Signaling link management functions such as initial alignment, changeover, change-back, and emergency alignment were executed properly by the STPs and SSPs.

(2) The Nortel Networks BBSTP performed signaling network management functions in accordance with requirements specified in references (c) and (d).

c. Summary. The Nortel Networks BBSTP with Software Release USP 7.0.5 meets the interoperability requirements for deployment in DSN and is certified for joint use in accordance with the requirements set forth in references (c) and (d). A summary of test results is listed in table 2-4.

12. TEST AND ANALYSIS REPORT. No detailed test report was developed per the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system -- ERD uses unclassified (NIPRNET) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNET at https://stp.fhu.disa.mil/. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at http://jit.fhu.disa.mil (NIPRNET), or http://199.208.204.125/ (SIPRNET). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at http://jitc.fhu.disa.mil/tssi.

Table 2-4. Nortel Networks BBSTP with Software Release USP 7.0.5 Conformance and Interoperability Status

Conformance and Exchange Requirement Status			
Conformance Requirement	**ER/Criteria**	**Critical**	**Status**
SS7 Network Structure	SS7 structure (GSCR Para 6.5.1)	Yes	Certified
	Gateway screening (GSCR Para 6.5.1.1)	Yes	Certified
Signaling Link Characteristics	SS7 link performance with stored program control switches (GSCR Para 6.5.1, 6.5.2)	Yes	Certified
Signaling Message Handling, Formats, and Codes	LSSU codes and format (GSCR Para 6.5.3, 6.5.4, 6.5.10)	Yes	Certified
	Emergency alignment (GSCR Para 6.5.2, 6.5.4)	Yes	Certified
	Message formats (GSCR Para 6.5.10, 6.5.11)	Yes	Certified
	Message handling (GSCR Para 6.5.3)	Yes	Certified
	SCCP capabilities (GSCR Para 6.5.5)	Yes	Certified
	Load sharing (GSCR Para 6.5.3.1)	Yes	Certified
Signaling Network Management	Signaling link management (GSCR Para 6.5.4)	Yes	Certified
	Signaling route management (GSCR Para 6.5.4)	Yes	Certified
Error Detection and Recovery	Basic error detection and recovery (GSCR Para 6.5.2.1)	Yes	Certified
	PCR error detection and recovery (GSCR Para 6.5.2.1)	Yes	Certified
Signaling Link Congestion	Signaling link congestion (GSCR Para 6.5.4.2)	No	Not Tested
V.35	A-Link Signaling (GSCR Para 6.5)	Yes	Certified
	B-Link Signaling (GSCR Para 6.5)	Yes	Certified
	C-Link Signaling (GSCR Para 6.5)	Yes	Certified
OCU-DP	Same as V.35	No	Not Tested[1]
DS0A	Same as V.35	No	Not Tested[1]
DS1	Same as V.35	No	Not Tested[1]

LEGEND:

A-Link - Access Link (SS7)
B-Link - Bridge Link (SS7)
C-Link - Cross Link (SS7)
DS0 - Digital Signal Level Zero: One 64 kbps channel
DS0A - A process where a sub-rate signal is repeated 20, 10, or 5 times to make a 64 kbps DS0 channel
DS1 - Digital Signal Level One: 1.544 Mbps North American Transmission
ER - Exchange Requirements
GSCR - Generic Switching Center Requirements
ITU - International Telecommunication Union
kbps - kilobits per second
LSSU - Link Status Signaling Units
Mbps - Megabits per second
OCU-DP - Office Channel Unit-Data Port
PCR - Preventive Cyclic Redundancy
SCCP - Signaling Connection Control Part
SS7 - Signaling System 7
STP - Signal Transfer Point
V.35 - ITU standard for trunk interface between a network access device and a packet network

Note:
1 Per the GSCR, only one of the four STP interfaces is required for certification (V.35, DS0A, DS1, or OCU-DP).